

Price promotions and their effect upon reference prices

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This is an Accepted Manuscript of an article published in the *Journal of Product and Brand Management*, available online: <http://www.emeraldinsight.com/doi/abs/10.1108/JPBM-01-2014-0485>

Please cite: Ben Lowe , Fanny Chan Fong Yee , Pamela Yeow , (2014) "Price promotions and their effect upon reference prices", *Journal of Product & Brand Management*, Vol. 23 Iss: 4/5, pp.349 – 361. <http://dx.doi.org/10.1108/JPBM-01-2014-0485>

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Abstract

Purpose – The purpose of this study is to resolve inconsistencies in the literature about how one-time price promotions affect reference prices. Specifically this study suggests that the measure of reference price employed within a study (e.g., expected price or fair price) can affect the outcomes of that study.

Design/methodology/approach – This research uses three separate experiments, replicating and extending existing work, to simulate purchasing decisions for products in the context of a price promotion. Experiments allow careful control of the confounds presumed to cause the inconsistencies between studies.

Findings – Study 1 shows that measurement of different reference prices within the same experiment leads to carryover effects, which inflate the correlation between measures. Expected price and fair price appear to be conceptually and empirically distinct and should be measured separately to reduce design artifacts. Study 2 shows that one-time price promotions affect fair price, but not expected price, and Study 3 shows expected price and fair price converge after multiple promotions.

Research implications – Independent measurement of reference price concepts allows robust claims about their distinctiveness. These findings have implications for how reference price should be measured in survey research and for pricing and promotional strategy.

Originality/value – This research contributes by showing how the measure of reference price used affects the outcomes of price promotion studies. It does this through the replication and extension of past research. Replication allows greater confidence in the findings of past research and testing the same findings under different conditions allows for the boundaries of existing research to be delimited, and generalizations to be made.

Keywords Reference price, expected price, fair price, price promotion.

Paper type Research paper

Introduction

The study of consumer reference prices has a long tradition in marketing and makes several contributions to the literature on consumer decision making (Mazumdar, Raj, and Sinha, 2005). A number of studies examine how price promotions affect reference prices (e.g., DelVecchio, Krishnan, and Smith, 2007; Lowe and Barnes, 2012), and these are important because promotions can lower a consumer's reference price. Understanding how price promotions affect reference price perceptions is instrumental to designing effective promotions and managing reference price. However, little consensus exists about the degree to which *one-time* price promotions affect reference price (e.g., Chandrashekar and Grewal, 2006; Sinha and Smith, 2000). Following Sinha and Smith (2000), one-time promotions reflect an infrequent price promotion, as opposed to multiple, more frequent price promotions. Replicating and extending prior research, this article proposes that the literature's inconsistency is explainable by the operationalization of reference price. Specifically, the aim of this research is to ascertain how consumer response to price promotions differs depending on the reference price which is measured. Consequently, in some circumstances, reference price effects may be a function of measurement artifacts.

Few researchers examine systematically the operationalization of the reference price concept, despite clear conceptual differences between alternative measures (i.e., fair price as a normative price or expected price as a memory based price), and the need to understand the issue of overlapping constructs (Mazumdar, Raj, and Sinha, 2005, p. 99). Instead, research often justifies measurement of reference price based on past research (i.e., Grewal, Monroe, and Krishnan, 1998; Kalwani and Yim, 1992) or uses some kind of reference price index to describe its multi-faceted nature (Chandrashekar and Grewal, 2006; Folkes and Wheat, 1995). These

studies make a variety of useful contributions, yet reference price utilization is likely to be context specific (Briesch, Krishnamurthi, Mazumdar, and Raj, 1997; Chandrashekar and Jagpal, 1995; Lowe and Alpert 2010; Rajendran and Tellis, 1994). For example, when a new type of baby food appears on the market (e.g., organic, “home-made”, vitamin enhanced) a buyer may be more likely to judge its expensiveness by using an expected price or a fair price, depending on how new the product is perceived to be.

Kalwani and Yim’s (1992) article on the effect of promotion depth and frequency on price expectations *directly* measures price expectations, yet, since then few studies empirically examine the distinction between expected price and other important reference price constructs such as fair price. Understanding consumer reference prices and their effects upon consumer behavior is likely to be influenced by the operationalization of reference price and misspecification of reference price can lead to obscured effects when in fact an effect is present. Finally, understanding how price promotions affect separate reference price concepts is important because the design of price promotions can affect important behavioral constructs such as brand switching and stockpiling behavior (Gupta, 1988). As Chandrashekar (2001) suggests, it is possible for two consumers to evaluate the same product at the same price, very differently. The different evaluations can lead to perceptions that will impact on the role of reference prices in consumer decision making processes.

Specifically this research seeks to determine and explain how one-time and multiple price promotions affect *different* reference price perceptions, and thus add to the debate about the distinction between reference price concepts. Using three experiments, which replicate conditions from prior research (i.e., Kalwani and Yim, 1992; Slonim and Garbarino, 1999), this research explores the distinct effect of two different reference prices after a price promotion and

suggests that the inconsistency in the literature can be explained by how reference price is operationalized. Study 1 shows how different methods of eliciting a reference price influences the reference price through carryover effects, pointing to the possibility of spurious reference price effects in some circumstances. Study 2 extends Study 1 by showing that large one-time price promotions influence fair price perceptions, but not expected price perceptions, emphasizing the importance of reference price measurement. Study 3 extends Study 2 by showing how the different reference price concepts are influenced by multiple price promotions, and finds multiple promotions affect both fair price and expected price perceptions, and that over time fair price converges with expected price. A novel aspect of this research is the measurement of different reference price concepts independently, eliminating carryover effects, and enhancing our ability to generalize. This research contributes to the literature on price promotions and reference prices by showing how different measurement approaches can affect reference price, and showing how measurement of the reference price construct explains alternative effects from price promotions.

Reference price, one-time promotions and multiple promotions

Empirically, reference price effects are relatively robust and a distinctive and enduring aspect of the consumer behavior literature (Kalyanaram and Winer, 1995; Mazumdar, Raj, and Sinha, 2005). However, inconsistencies remain within the literature in regard to how one-time and multiple price promotions affect reference price perceptions (see Table 1 for a summary of how different studies have conceptualized reference price, and the effects that different price promotion frequencies have had on the reference price).

TAKE IN TABLE 1 HERE

Table 1 shows that some research finds one-time price promotions shift reference price, but only when reference price has been conceptualized as some form of index including fair price. For example, Folkes and Wheat (1995) show that reference price, measured as an index, decreases with a promotion, but to differing degrees depending on the type of promotion (i.e., a coupon, a rebate or a discount). Likewise, Grewal, Monroe, and Krishnan (1998) show that reference price, measured as an index of average price and fair price, is affected by the advertised reference price. This finding is consistent with Chandrashekar and Grewal (2006) who show how a consumer reference price index (normal, fair, lowest and reservation price) is affected by the advertised reference price and the sale price using a one-time promotion.

On the other hand, prior research implies that frequent price promotions are necessary to influence reference price perceptions. For example, Sinha and Smith (2000) hypothesize and find that one-time price promotions do not statistically affect expected price (though mean expected price is lower). Consistent with Kalwani and Yim (1992) they argue that changes to reference price are evoked only when promotions have sufficient frequency and depth. This assertion is partially supported by DelVecchio, Krishnan, and Smith (2007) who show that price expectations reduce after several rounds of promotion. Using a series of different reference price measures, measured within the same survey, Diamond and Campbell (1989) show that multiple price promotions over a 20 week period lead to statistically different changes in most reference price measures (i.e., expected price, average price, most frequent price, highest price).

Therefore, it appears that the literature is relatively inconclusive about how one-time and multiple price promotions affect reference price perceptions. Specifically, it appears that the effect upon reference price perceptions depends upon how reference price is conceptualized and

measured. When measured as an index including fair price then one-time price promotions are sufficient to reduce *reference price*. However, when measured as expected price then one-time price promotions are not sufficient to reduce *reference price*. Frequent price promotions consistently change reference price, whether measured as an index or as an expected price. Thus, one explanation for these findings could be the fragmented nature of reference price measurement and the variety of different measures that have been used in the literature. This issue is not new to the literature and several studies make calls for further research and integration in the area (Bearden *et al.*, 1992; Chandrashekar and Jagpal, 1995; Garbarino and Slonim, 2003; Lowe and Alpert, 2007; Mazumdar, Raj, and Sinha, 2005). However, despite the importance to consumer behavior of understanding reference price measurement, few studies examine the issue in any depth for *direct* measures of reference price using survey based approaches (some notable exceptions are Garbarino and Slonim, 2003, Bearden *et al.*, 1992 and Chandrashekar and Jagpal, 1995). Thus, a need exists for consensus and theory about which reference price measures are evoked under different circumstances. This illustrates the need for further replication of existing reference price phenomena under new circumstances.

Expected price and fair price

Conceptual and empirical distinctions

Despite the plethora of measures identified in the literature, two related, yet conceptually distinct concepts are commonly cited; an expected price (Chandrashekar and Jagpal, 1995; Kalwani and Yim, 1992; Mazumdar, Raj, and Sinha, 2005; Thaler, 1985; Urbany, Bearden, Kaicker, and Smith-de-Borrero, 1997), and a fair price (Bolton, Warlop, and Alba, 2003; Campbell, 1999; Grewal, Monroe, and Krishnan, 1998; Monroe, 1973; Xia, Monroe, and Cox, 2004). An

expected price can be described as a reference price based on "...consumers' memory or contextual information" (Mazumdar, Raj, and Sinha, 2005, p. 98) and relates to a positivistic belief about the product's price, using past prices as the frame of reference. Though expected prices have been measured directly (through survey approaches) and indirectly (through the use of past prices based on scanner data), conceptualizations typically involve an average based on past prices with different time lags and different weightings (for a review of models of price expectations see Mazumdar, Raj, and Sinha, 2005, p. 89). Typically such models suggest that the most recent prices are the most influential in forming price expectations. Furthermore, consumers also rely on the existence of promotions as a proxy for further promotions. More frequent promotions are associated with expectations of future deals, and this reduces expected price (Kalwani, Yim, Rinne and Sugita, 1990). Therefore, typical antecedents to one's price expectations include the range of past prices one has been exposed to, with a greater weighting given to the most recent prices, and promotion frequency.

The concept of fairness has attracted increased attention in the marketing literature recently (Campbell, 1999; Xia, Monroe, and Cox, 2004), and relates to a normative belief about what a product *should* cost (Bearden *et al.*, 1992; Mazumdar, Raj, and Sinha, 2005). Primarily a fair price is based on what is deemed reasonable, acceptable or just by consumers (Bolton, Warlop, and Alba, 2003; Xia, Monroe, and Cox, 2004). Xia, Monroe, and Cox (2004, p. 3) provide the most comprehensive discussion of the concept in their seminal article and define fairness as "... a consumer's assessment and associated emotions of whether the difference (or lack of difference) between a seller's price and the price of a comparative other party is reasonable, acceptable, or justifiable." Fair prices are conceptually distinct from competing measures based on price expectations (Darke and Dahl, 2003; Thaler, 1985). For instance,

Garbarino and Slonim (2003) propose that fair price will always be lower than expected price because consumers do not have knowledge of the firm's actual profit margins, and thus assume the firm is making a reasonable profit even at the lowest observed price. This is justified on the basis of the principle of dual entitlement (Kahneman, Knetsch, and Thaler, 1986), where buyers perceive that sellers are receiving a reasonable profit (otherwise they would not be selling), and they themselves are attaining reasonable value from the transaction. Based upon this premise the lowest prices observed tend to be more heavily weighted and have a larger impact on the formation of a fair price than they have for an expected price. This assertion is consistent with the empirical results of Lichtenstein, Burton, and Karson (1991). In their research the fair price is significantly lower than the normal price in the presence of a price promotion (normal price is conceptually and empirically similar to an expected price – e.g., see Bearden, Kaicker, Smith-de-Borrero, and Urbany, 1992).

Bolton, Warlop and Alba (2003) define perceived fairness as whether an outcome and/or a transaction process are seen by consumers as reasonable, acceptable and just. Xia, Monroe and Cox (2004) add that all fairness perceptions are comparative in nature. Therefore, in essence, the concept of fair price relates to a normative notion of what consumers believe the price should be, rather than what the price is expected to be.

A fair price is defined as how much a customer thinks a service (or good) should cost, and so to assess the fairness of a price, customers may rely on the last price paid, the price most frequently paid, market prices or posted prices (Kahneman, Knetsch, and Thaler, 1986). Haws and Bearden (2006) have examined fairness response to differential pricing across consumers and found that paying a higher price than another customer for the same product from the same

vendor at the same time leads to strong perceptions of unfairness relative to price differences across products, vendors or time (Bolton, Keh and Alba, 2010).

Interestingly, the framing of the price has a significant effect on how fair the price is perceived to be. Prospect theory suggests that consumers perceive prices framed as gains as fairer than those framed as losses, even if the situations are economically equivalent (c.f. Chen, Monroe and Lou, 1998). So for example, a ‘buy one get one free’ may be perceived to be fairer, than a fifty percent discount in some circumstances.

Several studies show an *empirical association* between expected price, fair price, and other reference price concepts. For example, Folkes and Wheat (1995) create an index from measures of reservation price, fair price, reasonable price and expected price ($\alpha = 0.92$). Similarly, Chandrashekar and Grewal (2006) create an index from measures of fair price, normal price, lowest price and highest price ($\alpha = 0.88$).

Other studies also note the somewhat strong association between the different measures. In trying to distinguish between competing measures used in the literature, Bearden *et al.* (1992) find that the normal, expected and average prices tend to have the same mean as each other but different means to the fair price. These results are somewhat consistent with the findings in Lichtenstein, Burton, and Karson, (1991). Thus, normal and average prices appear to be measuring the same construct as expected price (this finding makes intuitive sense given all of these relate to some kind of historical based reference price). In particular, they find support for expected price over fair price, whereas Chandrashekar and Jagpal (1995) find support for fair price over expected price. Garbarino and Slonim (2003) also note the high correlation between expected price, fair price and reservation price, and find that fair price is lower than expected price, and that fair price perceptions are most likely to be associated with perceived

expensiveness. Chandrashekar (2001) uses fair price, reservation price, lowest price and normal price and compares a non-unitized model of reference price formation with a unitized model of reference price formation, finding that reference price utilization is individual specific and moderated by the concept of involvement. Therefore, prior research has typically argued that fair price and expected price are conceptually distinct (Garbarino and Slonim, 2003; Mazumdar, Raj, and Sinha, 2005). Yet, much empirical research has assumed they are conceptually similar and can be summated as a multi-item scale (Chandrashekar and Grewal, 2006; Folkes and Wheat, 1995). Research has yet to examine the degree of association between these concepts when measured within the same survey, and compare this to when they are measured independently.

Carryover effects in reference price research

To date all studies examining the distinct effects of different reference price concepts ask respondents their reference price perceptions *within the same survey*. Asking respondents to answer these questions within one survey may lead to carryover effects (Bickart, 1993). Carryover effects refer to the cognitive processes that affect how respondents answer survey questions. Rather than answering survey questions by retrieving information from memory, carryover effects imply that respondents use prior survey questions to influence their response to subsequent survey questions, because they may construct answers on the spot (Simmons, Bickart and Lynch, 1993). Therefore, we might expect that if a respondent was asked what their expected price for a product was and then asked about their fair price for the same product, the expected price might influence the fair price (and vice versa). The existence of carryover effects is not new to survey research (e.g., see Schwarz, Strack, and Mai, 1991 or Tourangeau, Rasinski,

Bradburn, and D'Andrade, 1989), but frequently researchers measure reference price as an index with multiple measures, and so it may present an issue in terms of the reference price effects that researchers claim to be observing. Indeed, design artifacts such as carryover effects have been noted in reference price research (Janiszewski and Lichtenstein, 1999), but no systematic attempt to empirically establish their existence has been made. Thus a more objective understanding of the distinct effects of different reference price concepts can be obtained by measuring the different reference price concepts separately, rather than simultaneously. Furthermore, concerns for face validity, and conceptual distinctiveness between the different reference price constructs, suggests measurement and analysis of the constructs separately.

So far the evidence for the empirical distinction between expected price and fair price is mixed, yet this research issue is an important topic in the measurement of reference price, and is important in understanding reference price effects within survey research. A more conservative empirical test of the relatedness of expected price and fair price would be to measure the concepts separately, rather than in the same survey. This approach follows similar research in the literature which has compared reference price measures for other purposes (e.g., Garbarino and Slonim, 2003; Urbany *et al.*, 1997). Typical tests of discriminant validity might employ structural equation analysis using multi-item scales. However, currently there is no multi-item scale available in the literature for expected price and fair price as independent constructs. As such, from a methodological perspective, one may expect that if reference price perceptions are ascertained within the same survey, this measurement approach will lead to carryover effects which will i) reduce the actual difference between fair price and expected price even though the two concepts are conceptually distinct (Darke and Dahl, 2003; Garbarino and Slonim, 2003; Thaler, 1985), and ii) inflate the correlation between fair price and expected price.

H_{1a}: The difference between fair price and expected price is greater when measuring reference price perceptions separately than when measuring reference price simultaneously.

H_{1b}: The correlation between fair price and expected price is lower when measuring reference price perceptions separately than when measuring reference price simultaneously.

H_{1a} and H_{1b} are related but distinct tests of the discriminant validity differences between fair price and expected price. Specifically, H_{1a} posits that the two concepts have different values (which would be consistent with being conceptually distinct from each other). However, the two could have different values but might be statistically related (e.g., like height and weight). Therefore, H_{1b} is a separate test of discriminant validity, showing that they are not only different in value, but that their association is not necessarily as strong as prior research has suggested. Taken together, H_{1a} and H_{1b} provide a stronger and more robust test of discriminant validity than either test alone. H_{1a} and H_{1b} examine a methodological issue in the measurement of reference price perceptions and this paper posits that understanding this measurement issue is important to understanding other important effects in the reference price literature, such as how price promotions affect reference price perceptions.

Expected price, fair price and price promotions

While existing reference price studies make a variety of important contributions, so far the literature does not isolate and disentangle how one-time and multiple price promotions affect the different reference price concepts because of operational fragmentation and analysis of the different reference price concepts.

This research posits that the inconsistent findings in studies which examine one-time or multiple promotions can be explained by the separate and distinct effects of expected price and fair price, and their antecedents. Typical models of expected price are based on historical price data and show that price expectations are a function of past prices (Mazumdar, Raj, and Sinha, 2005). Over repeated transactions this assumption seems reasonable because consumers become conditioned to a price promotion and adjust their expected price to reflect historical prices and the presence of frequent price promotions (Kalwani and Yim, 1992). Thus, consistent with Kalwani and Yim (1992) and Sinha and Smith (2000) changes to expected price are unlikely to occur with one-time promotions. This prediction is also consistent with assimilation-contrast theory (Sherif and Hovland, 1964), whereby new price information is assimilated into a consumer's range of acceptable prices if the observed price is perceived to belong to their existing acceptable price distribution. However, Kalwani and Yim (1992) and Sinha and Smith (2000) refer to changes in reference price, and operationalize the concept as *expected price* (see Table 1). This article proposes that *fair price* will change given the conceptual and empirical distinctions between expected price and fair price.

Darke and Dahl (2003, p. 328), for example, note "...the surprising amount of value that consumers attach to getting a bargain..." Acknowledging the variety of plausible explanations in the literature, Darke and Dahl (2003) show that a powerful explanation relates to changes in consumers' perceptions of fairness when consumers receive a bargain. This change in perceptions of fairness may lead to differences in fair price perceptions, but not necessarily changes in expected price perceptions. The findings from Alba, Mela, Shimp, and Urbany (1999, p. 112) suggest that consumers may think they typically pay too much for products that are regularly priced, "Results using the fairness data ... suggested that the deep, infrequent

discount pattern led to lower perceived fairness because subjects believed that the brand was priced too high during non-deal periods.” This is consistent with the empirical results of prior research where consumers appear to systematically overweight the lowest observable price when arriving at their judgments of fair price perceptions (Garbarino and Slonim, 2003; Lichtenstein, Burton, and Karson, 1991). Thus consumers may make judgments about what is fair based on the presence or absence of a promotion, rather than just the frequency of the promotion. A promotion may signify that paying the regular price is paying too much, and paying too much might be deemed to be unfair. If a price is deemed to be unfair then perceived unfairness could reduce consumers’ fair price estimates once exposed to a product on promotion. Given fair price perceptions are subjective (rather than some weighted average of observed past prices), they are more likely to be influenced by social norms and consumer marketplace knowledge (Xia, Monroe and Cox, 2004), and thus large one-time price promotions may be more likely to influence fair price perceptions. This would be consistent with a contrast effect (Sherif and Hovland, 1964). Thus, consumer perceptions about what the firm is likely to do (price expectations), are not necessarily the same as consumer perceptions about what the firm should do (price fairness). Therefore, a large one-time price promotion will not influence expected price, consistent with Sinha and Smith (2000), but a large one-time price promotion will influence fair price in a downward direction.

However, this effect is only anticipated for large discounts that consumers are more likely to notice, as opposed to small discounts. Thus, for one-time promotions discount size likely moderates the effect of price promotions on reference price perceptions, such that large discounts lower perceptions of fair price more than expected price, yet for small discounts there will be no significant difference in fair price perceptions or expected price perceptions, For example,

Kalwani and Yim (1992) find a region of price insensitivity around the reference price equivalent to about 5% of the brand's average non-promotional price. This finding is somewhat consistent with the findings of Alba *et al.* (1999), where changes to price perceptions are seen to result from either large, infrequent discounts or small, frequent discounts. DeVecchio, Krishnan, and Smith (2007) argue that small discounts are not worth the mental effort to be integrated into price expectations. Darke and Freedman (1993, p. 961) state, "It seems highly likely that people's purchasing decisions will be influenced by the amount that they can save... When small amounts are involved, this factor may be relatively unimportant or even ignored." As such small one-time price promotions are not likely to affect expected price or fair price. Based on the above discussion, this suggests:

H₂: There will be an interaction effect between discount size and the reference price measure used, such that a large discount lowers perception of fair price more than expected price, while there will be no significant difference for a small discount.

However, as the frequency of price promotions increases, average price perceptions change even for small discounts (Alba *et al.*, 1999). Average price perceptions are analogous to an expected price based upon a price history (Bearden *et al.*, 1992), and as consumers become conditioned to lower prices with multiple price promotions, then one might expect fair price to change too, as judgments about what is reasonable/just converge with actual price histories.

Because fair prices are based on the principle of dual entitlement (Kahneman, Knetsch, and Thaler, 1986 – e.g., consumers receive reasonable value from the purchase and the producer is entitled to a reasonable price) then consumers may see frequent promotions as a signal that

firms are making a reasonable profit even at the discounted price, and as discounts become more regular then the fair price becomes lower and begins to be weighted more heavily to the discounted price. Likewise, as discounts become more frequent then forward looking consumers (Jacobson and Obermiller, 1990) will begin to factor in the regular discounts and to expect further discounts in the future. Consistent with Kalwani *et al.*, (1990), the more frequent the promotions, the more likely it is that consumers will expect a deal and the lower the expected price. Thus, with multiple price promotions the distinction between an expected price and a fair price will become fuzzier as a consumer's expected price perceptions, based on historical knowledge of prices, approach their normative prescriptions about what a price should be. Therefore, multiple price promotions lower expected price as well as fair price, such that fair price and expected price are lower than with a one-time promotion, and the difference between expected price and fair price therefore begins to converge. This would be somewhat consistent with some of the incidental findings from past research. For example, Kalwani and Yim (1992) show that price expectations decrease with discount frequency. Likewise, the findings from Diamond and Campbell (1989) show that fair price and expected price, along with other reference prices, are the same after 20 weeks of price promotions.

H_{3a}: When a product is being promoted over a series of weeks, fair price and expected price are lower than with a one-time promotion.

H_{3b}: The difference between fair price and expected price decreases as the number of weeks on promotion increases.

Method

The hypotheses are examined using an experimental framework with three separate studies. Study 1 is a cross-sectional experiment showing how different methods of eliciting reference

price estimates can influence the reference price through carryover effects. Study 2 is a cross-sectional experiment simulating a one-time price promotion at two different promotional levels to show how different price promotions affect different reference price concepts. Study 3 extends Study 2 by measuring reference prices at different points in time to see how frequency of promotion affects the different reference price concepts. Repeated calls to conduct reference price research under controlled experimental conditions such as these have been made in the literature (Mazumdar, Raj, and Sinha, 2005). Furthermore, an experimental study with hypothetical stimuli is suitable for this study into price promotions and reference price perceptions because of the ability to control consumer experiences and their exposure to stimuli.

Study 1

The experiment

Study 1 was designed to test the existence of carryover effects using a simple cross-sectional experiment. Via a product concept statement, Study 1 began by exposing respondents to a hypothetical product, on promotion within a product category that they were familiar with. Hypothetical brands were used to reduce confounds from prior knowledge and experiences. After exposure to the concept statement respondents were then asked questions about their reference price perceptions and other related constructs to i) assess the validity of the findings, ii) disguise the true purpose of the study, and iii) to avoid subjects focusing on the price questions which would otherwise become too salient. One-third of respondents were asked about their expected price perceptions and their fair price perceptions simultaneously within the same survey, and the remaining respondents were asked about *either* their fair price or expected price perceptions. Three weeks later those who had been asked about only one reference price measure were then asked about the other reference price measure, forming a one-factor design (1x3). The

expected price and fair price measures were counterbalanced as a check on validity (i.e., according to prior research expected price should be higher than fair price). The experiment was replicated across two product categories for generalizability.

Instrument and procedure

Pilot studies and stimulus design

Respondents were initially exposed to one of two products from an existing category which had a high degree of personal relevance to the target population. Ratings for personal relevance were ascertained from 38 students for ten frequently purchased products using the items from Mittal (1995). The products with the highest ratings for personal relevance were an energy drink ($M = 5.3$, $SD = 1.1$) and yearly gym membership ($M = 5.2$, $SD = 1.2$). Fictitious brand names were used to control for prior brand and price knowledge, and were generated and evaluated in another independent pilot study using 20 students, with the most highly preferred names being chosen. The product's regular prices were chosen to reflect market prices, and a large discount (50%) was used as this level corresponds with the findings in Gupta and Cooper (1992) where switching intentions are highest at around 50%. The product concept statements showed the product at a regular price over a number of weeks and the promotion was invoked in week 5.

Measures

Expected price was measured by asking respondents "How much would you expect to pay for [brand name]?" and fair price was measured by asking respondents "What do you think is a fair price for [brand name]?", following the measures in Garbarino and Slonim (2003). Other related constructs, such as perceived expensiveness and purchase intention were also measured, and perceived quality, product category knowledge, personal relevance, deal proneness and value

consciousness were measured to assess the influence of potential confounds. Perceived expensiveness was measured, rather than transaction value (as in Urbany *et al.*, 1997 and Bearden *et al.*, 1992), because past transaction value measures prompt explicit comparison to an expected price, thus biasing the reference price one uses. The measure of perceived expensiveness was taken from Garbarino and Slonim (2003) and was a single item 7-point semantic differential. Measures of purchase intention were adapted from Urbany *et al.* (1997), and consisted of three 7-point semantic differentials. Perceived product quality was measured with a single item 7-point scale from Slonim and Garbarino (1999, p. 7). Product category knowledge was measured using two 7-point items from Cowley and Mitchell (2003) and perceived relevance was measured using the five item 7-point semantic differentials in Mittal (1995). Deal proneness and value consciousness were also measured, based on 7-point Likert scales from Lichtenstein, Netemeyer, and Burton (1990), because differences in these variables may affect consumer response to promotions (Lichtenstein, Netemeyer, and Burton, 1990).

Confounds due to personal relevance and product category knowledge are not likely to be a major problem in this experiment because the products chosen are highly relevant to the target population, based on the pilot study. Also respondents were randomly allocated to experimental groups (Zikmund *et al.*, 2011). However, measurement of these variables also serves another purpose and that is to disguise the true purpose of the study and avoid respondents focusing on what would otherwise be the more salient price questions.

Data collection

Subjects were randomly exposed to one of the three treatments and participation was voluntary, but encouraged with incentives. For consumer experiments student samples are often used (e.g.,

Chandrashekar and Grewal, 2006; DelVecchio, Krishnan, and Smith, 2007; Lowe, 2010; Lowe *et al.*, 2012) because of sample homogeneity, and because experimental researchers are generally interested in testing the existence of an effect, rather than its magnitude. In total 115 completed responses were collected from undergraduate and postgraduate business students at a metropolitan university.

Results, analysis and findings

To assess the impact of the potential confounds the summated measures of perceived quality, product category knowledge, personal relevance, deal proneness and value consciousness were included as dependent variables within a MANOVA and the multivariate tests indicated no statistical difference in means between the experimental groups (*Wilks' Lambda* = .86, $p = .631$). Using a *t*-test to examine differences in expected price and fair price between experimental groups ($t(58) = -.24$, $p = .814$), no order effect was apparent in the reference price data (i.e., if expected price was asked first or if fair price was asked first) and mean expected price is higher than mean fair price.

H1a is examined by calculating the mean difference in reference price concepts and comparing this difference variable between the groups that were asked about the different reference price concepts separately, and the groups that were asked about the separate concepts simultaneously. Based on the energy drink data a clear difference in reference prices exists depending on whether or not the measures were asked separately ($M = .35$, $SD = .40$) or whether they were asked simultaneously within the same survey ($M = .14$, $SD = .28$) and this difference was statistically significant ($t(94) = 2.77$, $p = .007$). For the gym membership no statistical difference based on order of exposure of the reference price was apparent ($t(58) = -.91$, $p = .365$) and the main results are similar. Comparing differences in the reference price concepts between

groups revealed a larger difference in reference price concepts when measured separately ($M = 38.7$, $SD = 42.7$) than when measured simultaneously ($M = 18.5$, $SD = 39.2$) and these differences were statistically significant providing strong evidence of H1a ($t(94) = 2.31$, $p = .023$) in conjunction with the findings from the energy drink data.

H1b is tested by creating correlation coefficients between the reference price concepts for each of the experimental groups and comparing the coefficients between groups using Fisher's Z transformation as outlined in Cohen and Cohen (1983, p. 53). Fisher's Z transformation converts the correlation coefficients to a Z statistic and then tests the difference between these Z statistics using a t -test procedure. Where:

$$Z = \frac{1}{2} \ln \left(\frac{1 + \rho}{1 - \rho} \right)$$

and the differences are calculated by

$$z = \frac{(Z_1 - Z_2)}{\sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}}$$

When the expected price and fair price were measured simultaneously the correlation is very strong ($r = .90$, $p = .000$) and when measured separately the correlation is moderate and noticeably weaker ($r = .49$, $p = .000$). Fisher's Z transformation was statistically significant ($Z = 4.17$, $p = .000$) indicating the correlation between measures is stronger when measured simultaneously. The results also indicate that α decreases from 0.93 (when measured simultaneously) to 0.67 (when measured in separate surveys), below the conventional guidelines for reliability offered in Nunnally and Bernstein (1994).

The same procedure was repeated with the gym membership data and the results were largely the same, only not as strong. When the expected price and fair price were measured

simultaneously the correlation is strong ($r = .71, p = .000$) and when measured separately the correlation is moderate and statistically significant ($r = .47, p = .000$). These differences are statistically significant at the 5% level ($Z = 1.73, p = .042$). Cronbach's alpha also decreases from 0.83 to 0.64, again pushing α below conventional guidelines. Taken together the energy drink data and the gym membership data provide strong evidence of H1b and evidence that the correlation between reference price constructs is inflated when the constructs are measured in the same survey. These findings are attributed to carryover effects and thus question the extent to which researchers should use an index to measure related reference price constructs, and suggest the need for a greater understanding of their distinct effects and the situations in which they should be used. Using these results this research now examines hypothesis 2 to gain a greater understanding of how one-time price promotions affect the different reference price concepts under investigation.

Study 2

The experiment

Using a cross sectional experiment, Study 2 shows how one-time promotions affect different reference price concepts, measured independently, and shows how these effects are moderated by discount size. Using the same procedures as in Study 1, Study 2 began by exposing respondents to a product in a product category they were familiar with that was on promotion. This time the concept statement varied by discount size (small discount or large discount) and a no discount treatment was added to act as a control group. After viewing the product concept statement respondents were then asked questions related to their reference price perceptions, perceived expensiveness, purchase intentions and other constructs (as in Study 1). To eliminate carryover effects as identified in Study 1, half the respondents were asked about their fair price

perceptions and the other half of the respondents were asked about their expected price perceptions. This forms a simple 3x2 experimental design, replicated across two product categories for generalizability. We also took into account the effect of possible confounds by measuring perceived quality, product category knowledge, personal relevance, deal proneness and value consciousness, as in Study 1.

Instrument and procedure

In Study 2, respondents were again exposed to one of two products from an existing category. Two new products were chosen, also with high relevance to the sample, and were given hypothetical names. Hypothetical names were used to reduce confounds from prior knowledge and experiences. The products chosen were an 8GB USB stick ($M = 5.0$, $SD = 1.3$) and fair-trade coffee ($M = 5.1$, $SD = 1.4$). This time the discounts were set as 10% (a small discount) and 50% (a large discount). These discount levels are consistent with other price promotions research examining the effect of discount size (e.g., DelVecchio, Krishnan, and Smith, 2007, p. 161). The rest of the procedures and measures were the same as in Study 1, except two new measures were included for manipulation checks. Following Chen, Monroe, and Lou (1998) subjects were questioned about discount substantiveness and were also asked their perceptions of how frequently the brand was being promoted, both on 7-point rating scales. In total 248 completed responses were collected from undergraduate and postgraduate business students at a metropolitan university.

Results, analysis and findings

An initial MANOVA with the possible confounds (perceived quality, product category knowledge, personal relevance, deal proneness and value consciousness) as dependent variables indicates no statistical difference in means between the experimental groups ($Wilks' \Lambda =$

.72, $p = .561$). For the manipulation checks, perceived discount substantiveness is higher for higher discounts ($F(5,203) = 64.05$, $p = .000$) and no statistical difference in perceived discount frequency is observed ($F(5, 203) = 1.05$, $p = .395$).

Hypothesis 2

Study 2 was a 3x2 between subjects design with one dependent variable (reference price) and six treatments varying on discount size (no discount, small discount or large discount) and type of reference price measured (expected price or fair price). Reference price was measured independently to remove the carryover effects established in Study 1. Because we had one dependent variable, two independent variables (discount size and reference price measure) and a range of covariates based on the potential confounds, we tested hypothesis 2 with a 2-way ANCOVA, and this indicated acceptable power ($F(9,209) = 7.06$, $p = .000$, $1 - \beta = .999$). Mean reference price by experimental condition is plotted in Figure 1.

TAKE IN FIGURE 1 HERE

Figure 1 shows that with a large discount mean expected price changes from \$15.52 (in the no discount condition) to \$13.89, indicating a small drop in expected price perceptions ($t(42) = 1.54$, $p = .130$). However the difference is not statistically significant, so the large discount does not appear to affect *expected price* perceptions. The price promotion causes a bigger drop in consumers' *fair price* perceptions though. In the no discount condition mean fair price is \$14.45 and in the large discount condition mean fair price is \$10.59 and this difference is statistically significant ($t(41) = 3.88$, $p = .000$). Thus, a large discount seems to reduce *fair price* perceptions. For the small discount condition, a mean fair price drops to \$13.81 ($t(37) = -.36$, $p = .722$), and mean expected price increases slightly to \$15.88 ($t(42) = 1.54$, $p = .130$) (relative to the no

discount condition), but neither change is statistically significant. These results suggest that the difference between expected price and fair price increases with the size of the discount. This was confirmed statistically at the 10% level of significance by the interaction effect from the 2-way ANOVA ($F(1,202) = 3.79, p = .053$). Figure 2 shows the results for the fair-trade coffee.

TAKE IN FIGURE 2 HERE

Again the overall model is tested using a 2-way ANCOVA and indicates acceptable power ($F(9,209) = 5.84, p = .000, 1 - \beta = .80$). The fair-trade coffee data is similar to the USB data and shows that a large discount reduces expected price from \$3.00 to \$2.87, yet the difference is not statistically significant ($t(42) = 1.38, p = .175$). However, the large discount reduces fair price by a greater amount, from \$2.97 to \$2.32, and this difference is statistically significant ($t(41) = 2.17, p = .036$). With a small discount expected price reduces from \$3.00 to \$2.90 ($t(37) = 1.98, p = .056$) and fair price reduces from \$2.97 to \$2.84 ($t(38) = 1.40, p = .170$) and neither change is statistically significant. Again, as predicted, these results suggest that the difference between expected price and fair price increases with the size of the discount and this is confirmed by the statistical significance of the interaction effect between discount size and reference price measure used ($F(1,202) = 9.86, p = .000$).

In general, these findings provide further evidence of Garbarino and Slonim's (2003) findings that fair price is typically lower than expected price. The findings also provide further evidence of Sinha and Smith's (2000) conclusion that *expected* price will not change with a one-time promotion. However, the results here extend this current stream of research by showing that one-time price promotions can influence consumer fair price – a distinct reference price concept to expected price – though, the effects are not as strong for the fair-trade coffee data as they are for the USB stick data (i.e., smaller differences between fair price and expected price, and a

higher p-value for the large discount treatment). Study 3 extends Study 2 to show how consumer reference price perceptions change when promotion frequency increases.

Study 3

The experiment

For Study 3 the same procedures and measures were used as in Study 2 except respondents were exposed to price promotions over a number of weeks (as in Kalwani and Yim, 1992, and Slonim and Garbarino, 1999), rather than just a one-time price promotion. Study 3 includes the same discount levels as in Study 2 but no control group was included for the price level. While the experiment is essentially the same as Study 2, but with multiple promotions, Study 3 was conducted to allow within subjects effects to be examined alongside the between subjects effects. This forms a simple 2x2x2 experimental design, replicated across two product categories for generalizability. Again, as in Study 1 and Study 2, we measured perceived quality, product category knowledge, personal relevance, deal proneness and value consciousness, to assess the effect of potential confounds.

Instrument and procedure

A new group of respondents were exposed to the same new products as in Study 2, at the same prices and using the same promotion levels. However, this time the experiment simulated five weeks worth of price promotions over ten weeks in a lab environment, and subjects' measures were taken twice – once after the first promotion (in week 5) and again at the end of the promotion sequence. Twice during the ten weeks subjects were presented with a distracter task, in the form of a brain teaser, to erase short term memory effects. The same measures and procedures were used as in Study 2. In total 258 responses were collected from undergraduate and postgraduate business students and these were evenly allocated across treatments.

Results, analysis and findings

The potential confounds (perceived quality, product category knowledge, personal relevance, deal proneness and value consciousness) were again examined with a MANOVA and the multivariate tests indicated no statistical difference in means between the experimental groups (*Wilks' Lambda* = .81, $p = .233$). Perceived substantiveness is higher for higher discounts (time period 1: $F(1,109) = 33.11$, $p = .000$; time period 2: $F(1,109) = 132.50$, $p = .000$) and a statistical difference in perceived discount frequency is observed ($t(108) = -14.76$, $p = .000$).

Hypotheses 3a and 3b

H3a requires a comparison of reference price measures across the two time periods by experimental group. For the USB data, reference price for each time period is shown in Figure 3. As predicted, for the USB stick, the more frequent the promotions, the lower the reference price, for both expected price and fair price. This difference is statistically significant based upon a paired samples t-test ($t(110) = 7.02$, $p = .000$) and provides support for H3a. Figure 4 shows the results for the fair-trade coffee data.

TAKE IN FIGURES 3 AND 4 HERE

Again, reference price decreases as the number of promotions become more frequent, although the reference price seems to remain quite constant for the fair price, large discount treatment. These results are largely consistent with the predictions, and consistent with the USB stick data. The reference price measures are compared using a paired samples t-test and the results reveal they are statistically significant ($t(109) = 3.43$, $p = .001$). These results, coupled with the results for the USB stick strongly support H3a.

To examine H3b mean expected price and mean fair price for the USB stick data are plotted in Figure 5 based on a one-time promotion, and based on multiple promotions. Reference

price decreases as promotions become more frequent, regardless of the reference price used. Expected price decreases from \$14.10 to \$12.50 as the frequency of promotions increase. Fair price follows a similar pattern, albeit to a lesser degree, and decreases from \$11.72 to \$10.81. For one-time promotions the difference between expected price and fair price is statistically significant ($t(109) = 2.26, p = .026$), yet the difference between the two concepts is not significant for multiple promotions ($t(109) = 1.16, p = .132$), indicating convergence of the reference price concepts and support for H3b.

For the fair-trade coffee data the results are similar and reference prices by promotion frequency are plotted in Figure 6. Like the USB stick data, reference price decreases as promotions become more frequent. Expected price decreases from \$2.24 to \$2.12 as the frequency of promotions increase. Fair price follows a similar pattern and again this difference is not so large for the fair price treatment, with a decrease from \$2.10 to \$2.06. However, for the one-time promotions this difference is not statistically significant ($t(109) = 1.36, p = .176$), and there is no statistically significant difference for multiple promotions either ($t(108) = .53, p = .600$). As such, for the fair-trade coffee data the results are not statistically supported but are in the right direction. Thus partial support exists for H3b.

TAKE IN FIGURES 5 AND 6 HERE

Discussion, implications and conclusions

Replicating past research under different conditions, this research contributes to the literature on reference price perceptions and price promotions, by seeking to resolve inconsistencies in regard to how one-time promotions affect reference price perceptions. In particular the research posited that these inconsistencies could be explained by how reference price was operationalized; either as a fair price or as an expected price. These measures have been identified in the literature as

conceptually distinct reference price concepts, yet the literature typically uses some kind of reference price index to examine them, justified on the basis of a high Cronbach's alpha. However, the results from Study 1 show that the two concepts are not only conceptually distinct but appear to be empirically distinct also, consistent with, yet strengthening the findings of Garbarino and Slonim (2003). Specifically, this research is one of the first studies to examine reference prices by measuring them in separate surveys, rather than allowing estimates to be generated from the same survey. Thus measuring reference price as an index is appealing from an empirical perspective, not because the concepts are so strongly related, but because carryover effects inflate their correlation. These results add to the growing debate on the distinction between different reference price concepts (Mazumdar, Raj, and Sinha, 2005) and present a more robust case for marketing researchers carefully selecting a measure, rather than measuring multiple reference price concepts in one survey. These findings are in line with recent articles on single-item scales (Rossiter, 2002). However, to provide greater confidence in the findings here future research could develop multi-item scales for each of the key reference price constructs, and use more sophisticated multivariate analysis tools to try and further empirically distinguish between them.

With the presence of carryover effects in reference price measurement these findings provide insight into resolving the debate about whether, and how, one-time price promotions affect reference price perceptions. Study 2 shows that the effect of one-time price promotions on reference price can be explained by answering the question "which reference price?". Practically, Study 2 finds that large one-time price promotions influence fair price, rather than expected price. This finding is due to their conceptual distinctiveness, not carryover effects. Therefore, a large one-time promotion does not appear to influence reference price, if measured as an

expected price, arguably because a single promotion will not affect *expectations*. However, a one-time price promotion does affect fair price, and this research argues that this result is observed because fair price is a more emotional construct, and even the presence of a discount may influence consumer perceptions of fairness (Darke and Dahl, 2003). This finding is not repeated for smaller discounts because of the small absolute amount that can be saved. These results generalize across two different product categories but might not be replicable in product categories with a higher price level because category price level can moderate consumers' response to price (Chen, Monroe, and Lou, 1998; Darke and Freedman, 1993; Darke, Freedman, and Chaiken, 1995; DelVecchio, 2005; Sinha and Smith, 2000). In practice then, this may have implications for marketers who wish to increase their sales levels but do not want to reduce their reference price, for example, when administering a stock clearance sale.

Study 3 examines how fair price and expected price change over time with more frequent promotions. As the hypotheses predict the results are largely supportive of the assertion that expected price converges with fair price, though expected price is still always higher than fair price (Garbarino and Slonim, 2003). Therefore, combining separate reference price constructs into an index may be useful but only in mature markets where price perceptions are stable. This implies that a strategy of multiple price promotions needs to be used with caution because, for some product categories, it will have a lasting effect upon reference price perceptions. Interestingly, in this research, expected price seems to change more than fair price, perhaps because fair price perceptions relate to consumers' more enduring and subjective underlying beliefs about what a product *should* cost, rather than a more objective belief about what the product *will* cost. Thus further research should examine the conditions under which fair price will change, along the lines of recent research in this area (Campbell, 1999; Xia, Monroe, and

Cox, 2004). For example, given the fair price for the fair-trade coffee does not appear to be as malleable as the expected price (in Study 2 and Study 3), this finding may have implications for how fair price is perceived in fair-trade categories. One explanation is that the fair-trade coffee had important associations attached to its fair-trade status which affect how consumers generate a fair price estimate. A consumer may think heavy discounting is less fair for fair-trade brands if discounting transpires in a lower price for farmers who produce the coffee. As such this way of thinking could be reflected in higher, more stable consumer fair price estimates.

These findings have implications for the management of price promotions. If managers can better understand the reference price that is most likely to be evoked by consumers then this knowledge will impact how price promotions are managed. The simple act of discounting to induce consumption may trigger a step change in consumers' perceptions of fairness and reduce consumers' fair price estimates. Thus one-time, infrequent discounts should be used with caution. These findings are potentially relevant for price promotions of new products. A one-time introductory price promotion may enhance trial and adoption but may also affect consumer fair price perceptions and limit the new product's ability to maintain a higher price for a longer period of time. However, after multiple promotions the two constructs seems to converge and thus the distinction between them, from a behavioral perspective, becomes less apparent. Though in different contexts (i.e., different levels of price stability, different levels of competition etc.) the distinction between them may be more apparent.

The study of reference price perceptions has made a variety of contributions to the literature on consumer decision making. However, the literature is still largely unclear on which measures to use and how they differ. This research is one of the only studies that has examined differences in reference price perceptions between independent samples and these results

reinforce the calls made in prior research, and suggest that researchers should clearly distinguish between different measures of reference price in future research. The findings here have important implications for how reference price research is conducted and interpreted, and in this research the results show that measurement of reference price can impact interpretation about the effects of price promotions on reference price. Specifically the findings of this research show that one-time price promotions do affect reference price, but the degree to which this is the case depends on how one measures reference price.

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Table 1: Promotion Frequency and Changes to Reference Price based on reference Price Conceptualization

Study	Promotion Frequency (one-time/frequent)	Reference Price Conceptualization	Effect upon Reference Price
Folkes and Wheat (1995)	One-time	Index (reservation, fair, expected)	Reference price decreases
Grewal, Monroe, and Krishnan (1998)	One-time	Index (average, fair)	Reference price decreases
Chandrashekar and Grewal (2006)	One-time	Index (normal, fair, lowest, reservation)	Reference price decreases
Sinha and Smith (2000)	One-time	Expected price	No change in reference price
Kalwani and Yim (1992)	Infrequent or frequent discounts (e.g., 1, 3, 5, 7)	Expected price	No change in reference price (for infrequent discounts). Reference price decreases (for frequent discounts)
DelVecchio, Krishnan, and Smith (2007)	Frequent	Expected price	Decreases
Diamond and Campbell (1989)	Frequent	Expected price	Decreases

Figure 1: Reference Price by Discount Size and Reference Price Measure (USB Stick)

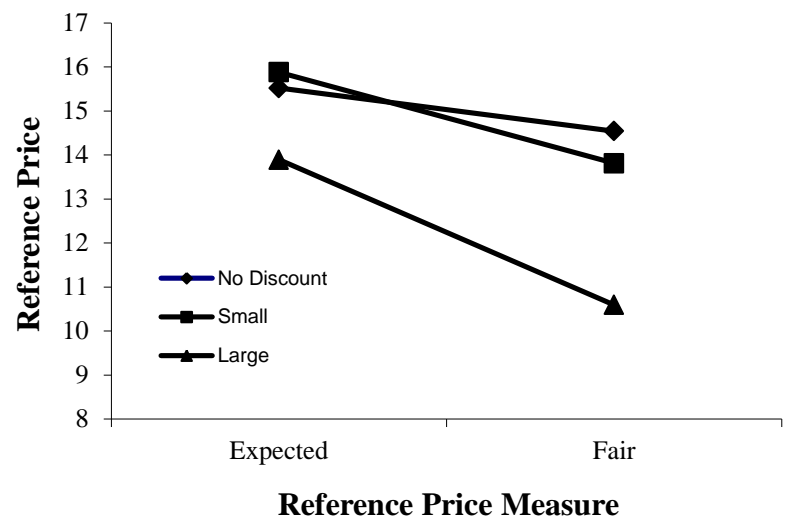


Figure 2: Reference Price by Discount Size and Reference Price Measure (Fair-trade Coffee)

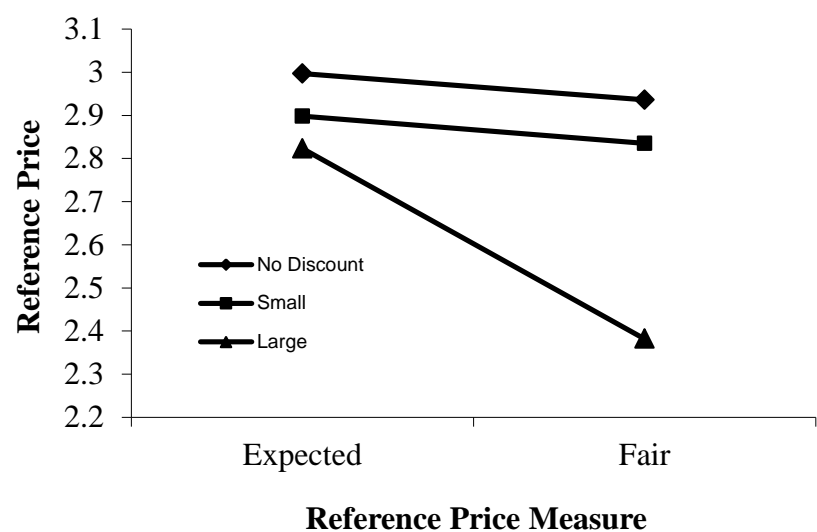


Figure 3: Reference Price by Experimental Group (USB Stick)

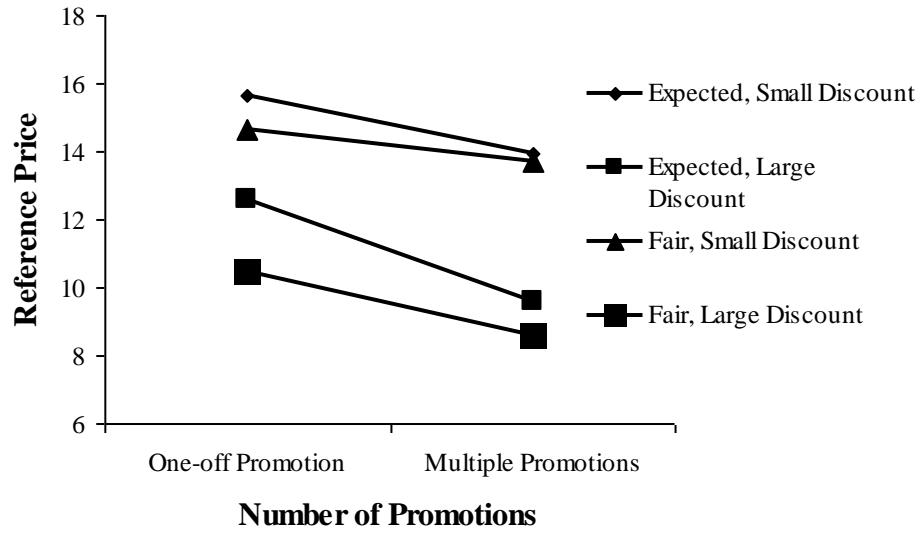


Figure 4: Reference Price by Experimental Group (Fair-trade Coffee)

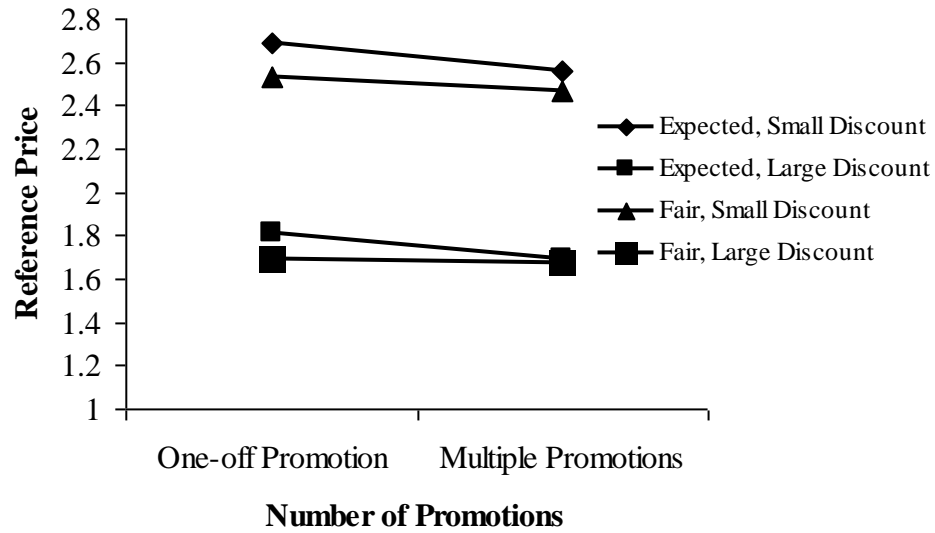


Figure 5: Reference Price by Promotion Frequency (USB Stick)

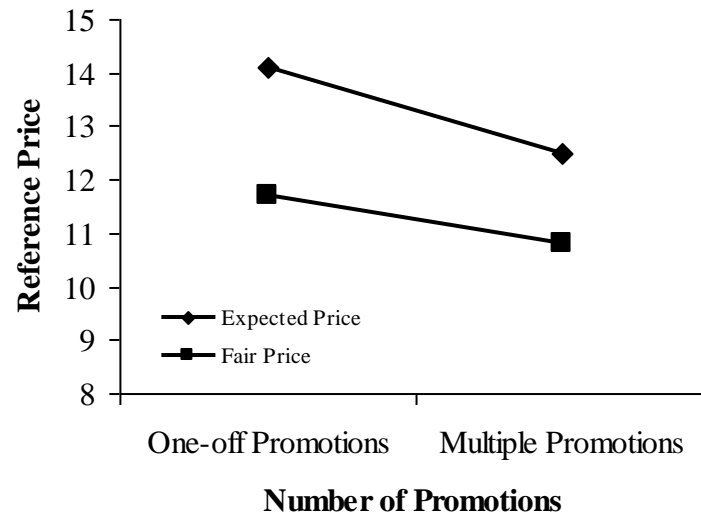


Figure 6: Reference Price by Promotion Frequency (Fair-trade Coffee)

